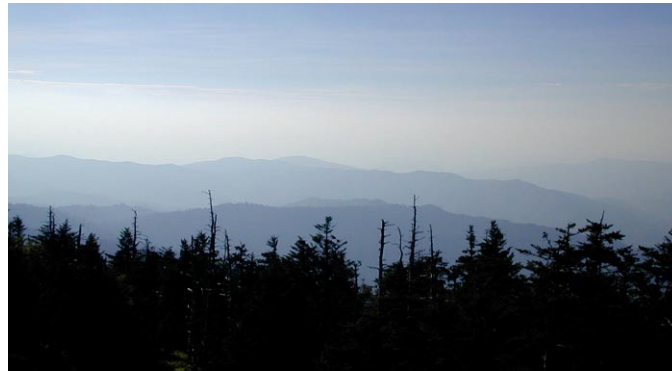


Field Report

Great Smoky Mountains National Park

■ 1.0 Summary



The Great Smoky Mountains National Park (GSMNP) is unique in its combination of biological diversity and cultural and historic resources. It is the most heavily visited National Park in the U.S., with 10 million visitors annually. This is more than twice as many visitors as any other National Park. The Great Smokies are also recognized internationally as International Biosphere Reserve and World Heritage Site. Its natural resources include a tremendous variety of tree species and forest types, flowering plants, over 200 species and 60 of mammals. It also includes historic and cultural resources representing both the original Native Americans who lived in the region and the pioneer culture that followed. Congress authorized the establishment of the GSMNP in 1926 for the “benefit and enjoyment of the people.” Many of the pioneer homes, churches and community buildings that existed at the time of the Park’s creation in 1934 are now among the Park’s major attractions.

Large sections of the Park are inaccessible by road and managed as Wilderness. The Park’s more accessible attractions, however, are being impacted by heavy volumes of traffic. These include Cades Cove, Clingman’s Dome, the Newfound Gap Road and the Roaring Fork Motor Nature Trail. Feasible Alternative Transportation System (ATS) options are focussed around these areas and are listed below:

- Continuation of current level of service on the existing Gatlinburg trolley route, with possible reduction in headways to 20 minutes or 15 minutes during peak periods.
- Implementation of transit service in the Cades Cove area. There are a number of potential options for serving this area, including transit service on the Cades Cove Loop Road and connecting or through service from Townsend, Sugarlands or Gatlinburg. The decision will rest partly on the availability of locations where adequate parking

can be provided. It is also unlikely that a transit system can be effective unless there is a significant reduction in the 800,000 automobiles (2.5 million people) that use the Cades Cove Loop Road annually. Therefore some type of automobile limitation, such as a reservation system, must be strongly considered as part of a transit program.

- Implementation of transit service on the Roaring Fork Motor Nature Trail. This popular AutoRoute of about six miles starts within the Town of Gatlinburg and is thus adjacent to areas served by the existing transit system.
- Implementation of transit service on the Newfound Gap Road (U.S. 441) across the Park between Gatlinburg and Cherokee. This service would serve the Newfound Gap Lookout and possibly the Clingman's Dome road as well.

All potential ATS options in the GSMNP represent significant challenges. Roads are narrow and, on the Roaring Fork, Newfound Gap and Clingman's Dome Roads, very steep. Speeds will be limited by sightseeing automobile traffic. Transit vehicles should not conflict with the historic theme of the Roaring Fork and Cades Cove areas, and if possible, should enhance that theme. GSMNP also faces serious air quality problems and will probably require that clean burning vehicles be used if a major ATS is implemented.

Nonetheless, ATS appears to have significant potential for meeting many of the GSMNP's objectives. These include resource preservation, relief of traffic congestion and parking deficiencies, enhancement of the visitor experience and air quality benefits.

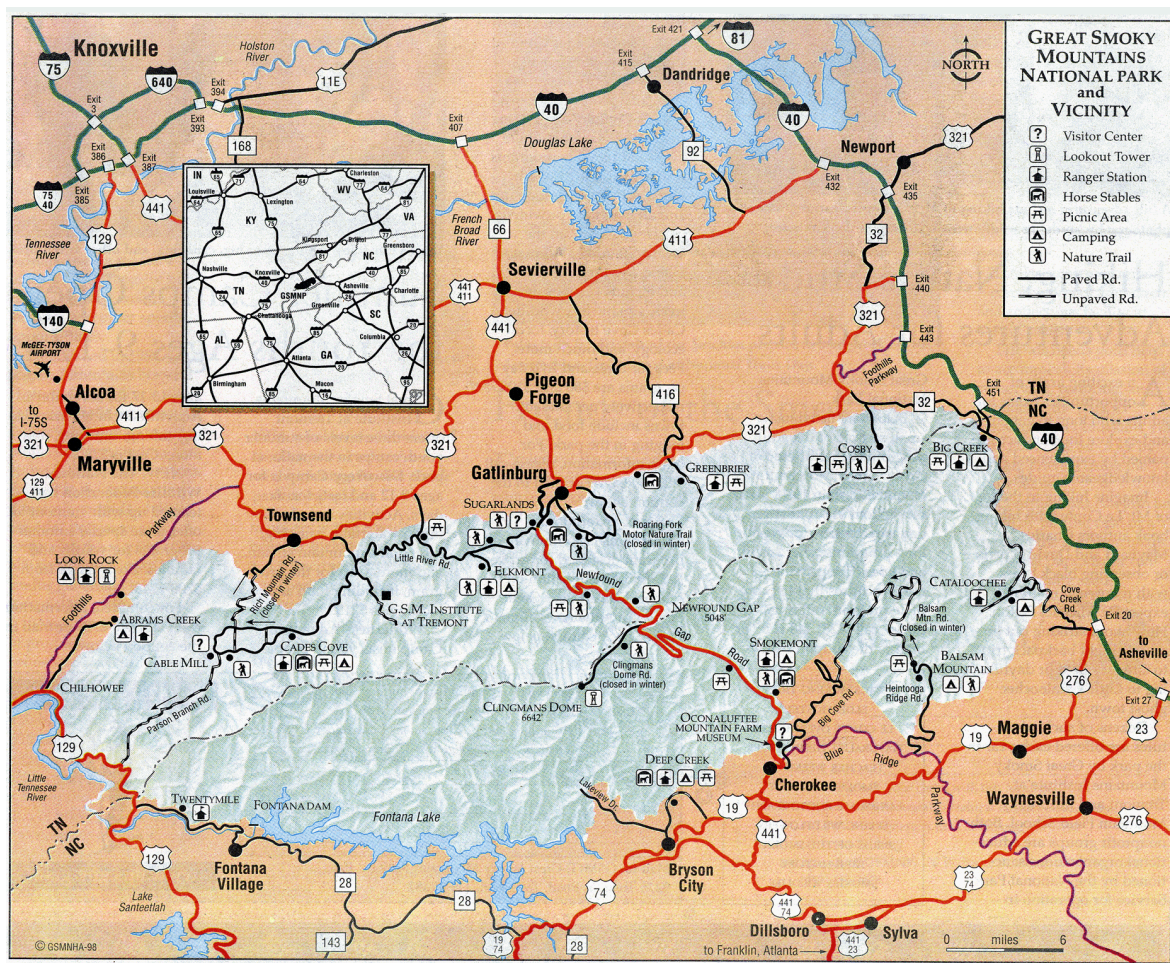
■ 2.0 Background Information

2.1 Location

The GSMNP is located in the southern Appalachian Mountains in Tennessee and North Carolina. The closest metropolitan areas are Knoxville, Tennessee and Asheville, North Carolina. The Park has good accessibility to major highways including I-40, I-75 and I-81. Major routes of entry are Route 441 from the north, Route 321 from the northwest and Route 411 via Route 19 from the south. Gateway counties include Sevier, Blount and Cocke Counties in Tennessee and Hayward and Swain Counties in North Carolina. Figure 1 shows the layout and location of the Park.

2.2 Administration and Classification

The GSMNP is located in the NPS Southeast Region.

Figure 1. Map of Great Smoky Mountains National Park and Environs

2.3 Physical Description

The GSMNP contains 521,000 acres in Tennessee and North Carolina, consisting primarily of mountainous terrain with elevations ranging from 800 to 6,643 feet above sea level at Clingman's Dome. The Park includes numerous natural features of note including rivers, streams, waterfalls and scenic valleys. There are 170 miles of paved roads, 100 miles of gravel roads and over 800 miles of trails in the Park, including a major portion of the Appalachian Trail. The Park is known worldwide for its diversity of plant and animal life.

The majority of those who enter the Park do so on U.S. Route 441, the only road that bisects the entire Park. The major entry points are Gatlinburg, Tennessee and Cherokee Indian Reservation, North Carolina, with the largest number of accommodations available in Gatlinburg and the nearby towns of Pigeon Forge and Sevierville. The Park's only lodging facility, LeConte Lodge, is accessible only by foot or horseback. There are 10 campgrounds in the Park, two of which are open year-round, but only one small retail store located in the Cades Cove Campground. This results in heavy use of Park roads between campgrounds and gateway communities, partially for entertainment but also for

purchase of food and basic necessities. Both Gatlinburg and Pigeon Forge have extensive local transit systems that use rubber tired trolleys and carry over 600,000 passengers annually. Gatlinburg recently extended their transit system into the GSMNP, providing service on an hourly basis to the Visitor Center, Laurel Falls trailhead and Elkmont Campground.

The main Visitor Center, Sugarlands, which is currently being expanded, and the Park Headquarters are located just inside the Gatlinburg entrance. Smaller Visitor Centers are located at Oconoluftee near the Cherokee entrance and in Cades Cove. Tourist attractions in the gateway communities are increasing, impacting traffic and usage patterns in the Park. A number of smaller gateway communities surround the Park in both states, but these have limited accommodations.

2.4 Mission and Goals of the National Park

Congress authorized the establishment of the GSMNP in 1926 for the “benefit and enjoyment of the people.” In 1982 General Management Plan (GMP) the purpose of the Park was stated as “to preserve these exceptionally diverse resources and to provide for public benefit from and enjoyment of them in ways that will leave the resources – and the dynamic natural processes of which they are components – essentially unaltered. Some benefits and pleasures available to visitors because of Park programs are increased knowledge of the natural environment and of our cultural antecedents, aesthetic gratification, and opportunities for rewarding activities that will not seriously impair the resources.”

2.5 Visitation Levels and Visitor Profile

The GSMNP is located within 600 miles of over 50 percent of the U.S. population. Visitation in 1998 was 9.9 million, representing an increase from 9.3 million in 1996 and 8.8 million in 1988. Approximately 1.5 million visitors were recorded in 1998 at the three main Visitor Centers, including 887,000 at Sugarlands, 401,000 at Oconoluftee and 411,000 at Cades Cove.

There are 10 accessible campgrounds in the Park containing about 1,000 campsites as well as 100 backcountry campsites. There were 358,000 camper nights recorded at the developed campgrounds in 1998 and 92,500 recorded at the backcountry campsites.

While visitation to the Park continues to rise, new entertainment opportunities in the nearby communities of Gatlinburg, Pigeon Forge and Cherokee are changing patterns. For many, the Park represents one of a number of attractions in the region. A detailed Visitor’s survey in 1996 highlighted these trends:

- Family groups comprised 77 percent of summer visitors and 70 percent of fall visitors. Summer visitors tended to be much younger, with 27 percent under the age of 15.
- Only two percent of visitors were international. Tennessee supplied the largest number of domestic visitors, 17 percent of the total.

- Repeat visitation levels are high, with 65 percent of summer visitors and 79 percent of fall visitors having been to the Park before. Fifty-four percent of summer visitors said the Park was their primary destination compared to 62 percent of fall visitors.
- About two-thirds of visitors (66 percent in summer and 62 percent in fall) spent less than one day in the Park. The majority of visitors (71 percent in summer and 73 percent in fall) entered the Park more than once during their trip.
- The most visited area of the Park was Cades Cove, which was visited by 54 percent in the summer and 61 percent in the fall.
- Average per capita expenditure is higher than in many Parks, with average group expenditure of \$564 in summer and \$561 in fall and average per capita expenditure of \$168 in summer and \$202 in the fall.
- Off-season visitation, as a proportion of the total, has been increasing. In 1988 50 percent of annual visits occurred in June, July and August, while this number was down to 41 percent by 1995. A secondary peak occurs in late October during peak foliage season. Winter season visitation increased from six percent to 11 percent during the same period.

■ 3.0 Existing Conditions, Issues and Concerns

3.1 Transportation Conditions, Issues and Concerns

Transportation issues are a high priority of GSMNP staff. Traffic levels have increased at a higher rate than visitation and development outside of the Park has greatly influenced traffic within the Park. GSMNP is participating actively in regional transportation planning activity. Most significant among these efforts is a regional transportation study that includes the Knoxville metropolitan planning organization (MPO) region, gateway communities and the Park. The project will include assessment of Park transportation needs and a study of the Foothills Parkway. Some of the general transportation issues impacting the Park are:

- Increased commercial development in the gateway communities is changing travel patterns. Many tourists now spend at least part of their time at attractions in the gateway communities and visit the Park as part of a day trip. In addition, visitation is growing much faster in the off-peak seasons, a trend that is likely to continue.
- Both Gatlinburg and Pigeon Forge have extensive, successful public transit systems that each carry over 600,000 passengers per year. The Gatlinburg system recently began serving the GSMNP with implementation of route between Gatlinburg, the Sugarlands Visitor Center, Laurel Falls Trailhead and the Elkmont campground. Ridership on this service has increased steadily over a three-year period from 5,000 to 14,000 annually. There is significant interest on the part of both Gatlinburg and the GSMNP in increasing the level of service and coverage if additional funds can be

identified. Due to air quality problems in the Park, any major increase in service would require use of clean fuel vehicles.

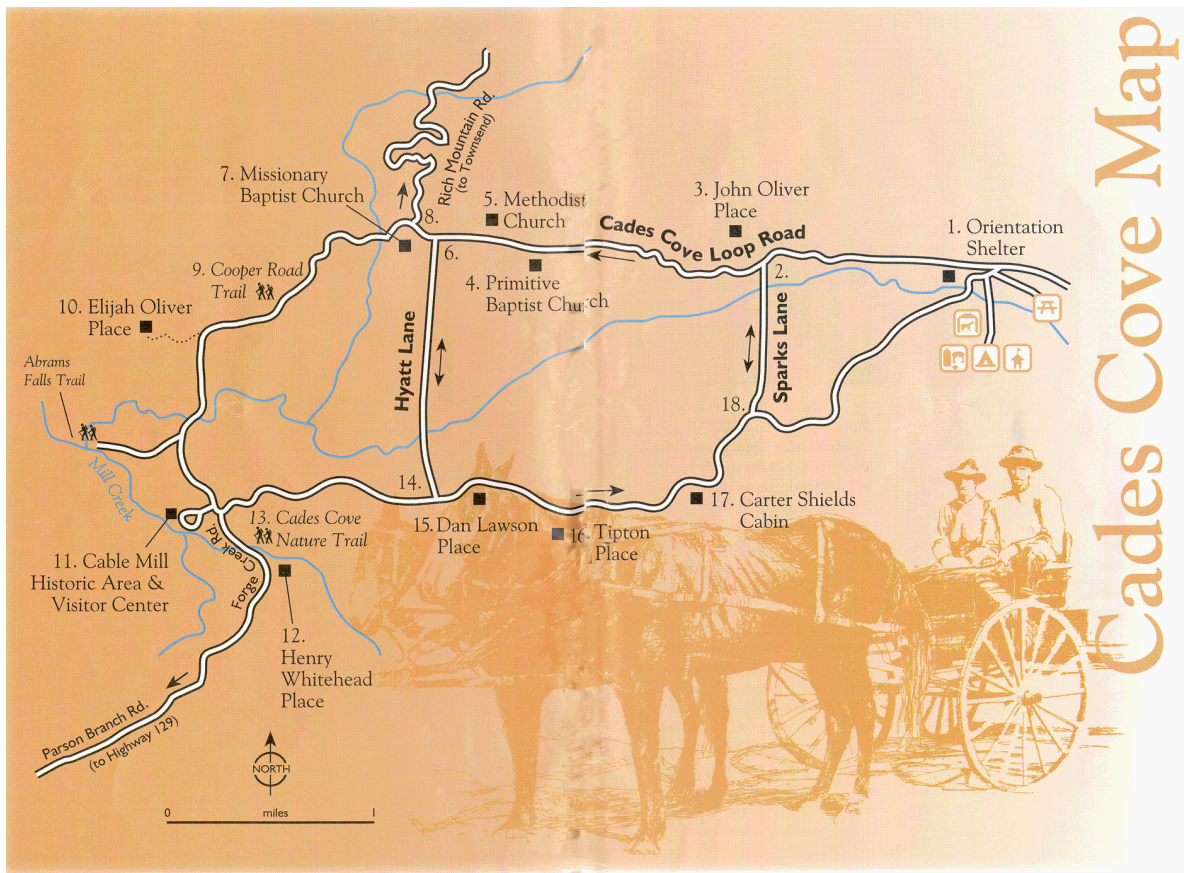
- The lack of commercial activity in the Park means that many of those who camp there frequently leave the Park to shop or eat in the gateway communities.
- Rapid residential growth, particularly on the Tennessee side of the Park, is impacting the limited roadway system that serves the Park.
- Because the Park is emphasizing preservation of natural and historic/cultural resources, it is highly unlikely that additional capacity will be provided on existing Park roads. Capacity increases are being provided on key roads outside the Park, however, including Route 19 in North Carolina and Route 321 in Tennessee. These improvements are likely to increase pressure on Park roads.
- A major expansion of the McGhee-Tyson Airport in Knoxville is currently underway. While the automobile will continue to serve as the primary mode of access to the Park for the foreseeable future, there will probably be an increased need for transportation between the Park and the Airport.

There are a number of specific transportation issues that are of critical interest to the GSMNP as well. A number of position papers have been prepared to document these issues:

Cades Cove

Cades Cove is the Park's most popular attraction, with 2.5 million visitors annually and 800,000 vehicles. A one-way loop road of 11 miles in length serves the Cove. There are a number of historic buildings along the Cave Road, including log homes, churches and farm buildings; the self-guided auto tour includes 16 marked stops. A Visitor Center is located at about the halfway point of the loop and includes a small store, restrooms and a variety of historic buildings that were moved to this location from elsewhere in the Park. The Cove area rests in a Valley surrounded by 5,000-foot mountains. Since much of the land is cleared it is an excellent area to experience both panoramic vistas and abundant wildlife. Figure 2A shows the Cades Cove Loop and attractions along the road.

The Cades Cove Loop Road represents what may be the GSMNP's major transportation challenge. The road is narrow and winding with nine-foot lanes and no shoulders along most of its length, and includes numerous areas with poor sight distance. Parking at many of the stops is limited, which results in tourists either missing key attractions or parking along the side of the road in unmarked spaces. The road is open only to bicycles before 10:00 a.m. on Wednesdays and Saturdays during peak season. At other times, however, conflicts between vehicles, bicyclists and pedestrians occur as illustrated below (see Figure 2B). The Loop Road experiences severe documented congestion with Level of Service "E" nearly half the hours during the peak month of the year. Visitor experience is being negatively impacted by congestion, air pollution is increasing in the Valley and resource damage is becoming a more serious problem.

Figure 2A. Map of Cades Cove**Figure 2B. Traffic Conflicts on Cades Cove Road**

The Cades Cove Loop Road can only be reached from the Townsend “Wye” via the Laurel Creek Road, a winding two-lane road. The two approaches to the Townsend Wye are from Townsend via Route 73 and from the Sugarlands Visitor Center and Gatlinburg via Little River Road. The Loop Road begins 10 miles from Townsend and 27 miles from Sugarlands. Visitors can exit the Cove via two remote mountain roads, Parsons Branch

Road, which connects to Route 129 in North Carolina and Rich Mountain Road, which connects to Route 73 west of Townsend, but cannot enter on either road. The Townsend “Wye” area itself is a highly congested recreational area for swimming and picnicking.

The GSMNP held a Charette on the Cove’s transportation problems in May 1998 and produced a document identifying transportation problems and potential solutions. Most importantly the report identified a series of information, public participation and planning activities required to develop a preferred solution to the Cove’s transportation problems. This effort occurred in parallel with a request for transportation planning funds to develop potential solutions to a higher level of detail.

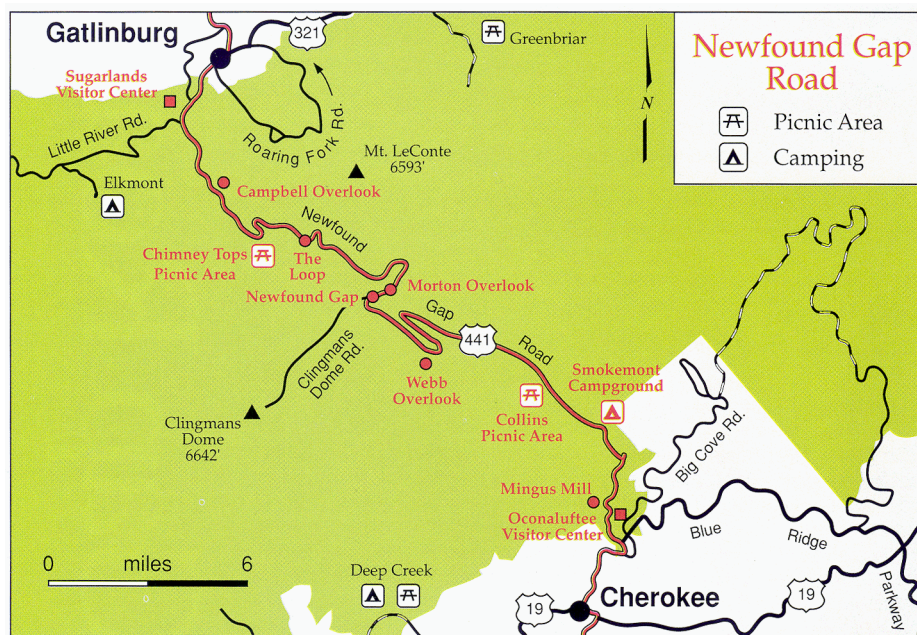
Foothills Parkway

The Foothills Parkway scenic roadway corridor parallels the northern boundary of the GSMNP. The purpose of the Parkway was stated by supporters as “to provide beautiful vistas of the Great Smoky Mountains along their northern flank and to disperse traffic away from the Park’s intensely used corridor between Gatlinburg, Tennessee and Cherokee, North Carolina.” Authorized by Congress in 1944, the Parkway was intended to be 72 miles. Construction of the Parkway did not begin until 1960 and to date, only 22.5 miles of the original corridor have been completed. Completed sections include 16.9 miles on the western end between Routes 129 at Chilhowee and Route 321 at Walland and 5.6 miles on the eastern end between I-40 and Route 321 at Cosby. There has been intermittent construction since 1982 on an additional 16 miles between Walland and Wear Valley. It is estimated that an additional \$60 million must be added to the \$40 million already spent to complete this section. The NPS is committed to complete this section. The total cost of completing the entire Parkway, however, is currently estimated at \$300 million.

A briefing statement on the Foothills Parkway prepared in September 1998 identified funding as one major challenge to completion of the Parkway. It also noted that there are severe environmental constraints along the corridor and major changes in land use that pose additional challenges to completion. The future of the Foothills Parkway is tied very closely to future vehicular access to the Park through Sugarlands and the Townsend Wye. The NPS has incorporated a study of the Foothills Corridor into a regional transportation study being conducted by the Knoxville MPO. The objective of this effort will be to build on earlier work to develop a more detailed, comprehensive subarea plan for the Foothills Corridor.

Newfound Gap Road

The Newfound Gap Road (U.S. 441) crosses the Park between Gatlinburg and Cherokee, North Carolina. The road serves as both a scenic drive through some of the most spectacular areas of the Park and a major through road connection between western North Carolina and eastern Tennessee. The road covers a distance of just over 29 miles between the two Visitor Centers at Sugarlands and Oconoluftee with elevation ranging from 1,465 feet at Sugarlands to 5,048 feet at Newfound Gap. Figure 3 shows the major Park attractions along the Newfound Gap Road.

Figure 3. Map of Newfound Gap Road

A recent transportation summary prepared by the Park indicated that the conflicting uses of the road result in substandard levels of service during peak months. This condition was documented on the Tennessee side of the Park between Sugarlands and Newfound Gap. Park officials have noted that nighttime traffic on the road has increased since the opening of a new Harrah's Casino in Cherokee. A number of overlooks are provided along the road, as well as picnic areas and parking for trailheads. In the Newfound Gap area itself, there is a large parking area on the east side of the road, which fills periodically.

The NPS is currently conducting an Environmental Assessment to help determine how to repair two tunnels on the Tennessee side of the Newfound Gap Road. The tunnels were built in the 1930s and have not had major repairs since that time. The limited vertical clearance of 12 feet, 4 inches along the outside of the travel lanes forces buses and some larger private vehicles toward the middle of the road, exacerbating unsafe conditions. The EA process will evaluate the various tradeoffs between environmental, safety and cost considerations. It is likely that some traffic disruption will be experienced during the construction period.

A seven-mile spur road connects the Newfound Gap Road to Clingman's Dome, the Park's highest point at 6,642 feet. The parking area at Clingman's Dome connects to a half-mile trail that serves an observation tower on top of the mountain. While parking is generally adequate, it can become crowded at peak times.

Roaring Fork Auto Tour

The Roaring Fork Auto Tour is a six-mile one-way loop through an area of the Park adjacent to Gatlinburg. Due to its proximity to Gatlinburg, Roaring Fork is very popular and experiences heavy volumes of traffic. The Loop contains a number of significant natural

features, trailheads, and overlooks in addition to a variety of historic buildings. The road is very narrow and winding and limited parking is available at many of the sites.

3.2 Community Development Conditions, Issues and Concerns

The region surrounding the GSMNP is experiencing rapid growth. The Park itself once served as the only significant attraction in the region but this is no longer the case as the recreational market continues to change. The major centers of tourist activity in the region are Gatlinburg and Pigeon Forge in Tennessee and Cherokee in North Carolina. Townsend, traditionally a gateway community but very rural in nature, is on the edge of major new development. Meanwhile, some of the smaller gateway communities near the eastern and western ends of the Park are likely to remain isolated and less developed. One of the Park's challenges is to better distribute the nearly 10 million annual visitors through more areas of the Park, while maintaining a wilderness environment.

Gatlinburg is the largest community adjacent to the Park, and has been largely built out for some time. The town is located in a mountain valley and has limited room for expansion. Many sites are now being redeveloped as modern chain motels replace older independent motels, for example. A new Aquarium and parking garage are being developed in the downtown area. Given its lack of vacant land, Gatlinburg is hoping to increase its \$300 million in annual tourist revenue by attracting more lucrative enterprises. In addition, Gatlinburg and the surrounding communities have become popular as summer home destinations. With its linear layout and relatively limited roadway capacity, Gatlinburg is well suited to public transportation. The City has been providing a transit service for 20 years and carried 680,000 passengers in 1998 on its rubber-tire trolley fleet. This is the fifth largest transit system in the State of Tennessee. The system includes 19 trolleys ranging in capacity from 19 to 36 passengers. Funding of the system, currently budgeted at about \$750,000 annually, is split in roughly equal parts between farebox revenue, FTA funds provided through Tennessee Department of Transportation (DOT) and parking garage revenue. The system recently went to year-round operation, although the level of service is limited during the winter months.



Pigeon Forge is located four miles north of Gatlinburg and is one of the fastest growing tourist destinations in the U.S. It has grown in less than 25 years from a country village to

a major tourist destination that generates nearly \$600 million annually. Major attractions include Dollywood, Dolly Parton's amusement park, several country music theatres and major shopping malls. The stretch of U.S. 441 north of Gatlinburg is a parkway operated by the NPS; thus Pigeon Forge provides the first opportunity for significant new development north of the Park. Unlike Gatlinburg, Pigeon Forge has large amounts of developable land and a six-lane right of way through the town on Route 441. It has also implemented a highly successful rubber-tired trolley system that carries over 600,000 riders annually. Additional development is anticipated in both Pigeon Forge and Sevierville, which is located just north of Pigeon Forge on Route 441.

Cherokee, North Carolina is an Indian reservation that borders the southern side of the Park. Cherokee has a number of older retail businesses and a limited number of lodging units. A Harrah's Casino recently constructed on the reservation is bringing major changes to the community. Route 19, which intersects Route 441 just south of Cherokee, is being widened and several new hotels are under construction to serve the Casino. These developments are likely to increase Cherokee's significance as a gateway community. Bryson City, located just west of Cherokee, is likely to experience spillover development as well.

Townsend, Tennessee is one of the Park's major gateways with over 2 million persons entering the Park annually via Routes 321 and 73. Townsend is still very rural in nature but likely to experience major development pressure over the next few years. Route 321 is being improved providing a better connection to the Knoxville region and the airport. Because of Townsend's proximity to Cades Cove and Laurel Creek, the GSMNP is very concerned about impacts of development on the Park. As a result, Townsend has very high priority in the Park's partnership efforts.

A number of smaller gateway communities surround the Park but for the most part they are remote and lack the tourist infrastructure found in the larger communities. The GSMNP does encourage tourists to use some of the lesser-visited areas of the Park. For example, those looking for an alternative to crowded conditions in Cades Cove are encouraged to explore Cataloochee, another historic area located in the southeastern corner of the Park.

The Park's economic impact on the region is significant. The 1996 Visitor Survey found that average visitor group expenditure is \$564 in the summer and \$561 in the fall. Due to smaller average party size in the fall average per capita expenditure is \$168 in summer and \$202 in the fall.

3.3 Natural or Cultural Resource Conditions, Issues and Concerns

The variety of historic, cultural and natural resources in the GSMNP is exceptional. Resource preservation is a continuing concern in the areas of the Park that are heavily used. Major trails along the Roaring Fork, Newfound Gap and Little River Roads, for example, receive very heavy usage while trails in more remote areas of the Park may be underutilized. Other concerns include resource damage resulting from overflow parking in unmarked areas and vandalism of historic sites in Roaring Fork and Cades Cove. The challenge of maintaining the open spaces in Cades Cove is another major concern;

agricultural and grazing activities traditionally used are being phased out in favor controlled burning.



The GSMNP's major environmental concern, however, is air quality. The Park's geographic location in relation to major power plants and industrial facilities, combined with prevailing weather patterns and the "trapping" effect of its mountain peaks, provides a striking example of how air pollution from remote sources can impact a National Park. The Park provides numerous educational exhibits for the public documenting sources of air pollution and the impact it has had on Park views over time. Average summer visibility, for example, has been reduced from 65 to 70 miles to only 12 miles.



Documented impacts on water, soil quality and vegetation have been identified as well, with high ozone levels and acidic rainfall two of the most significant problems. The GSMNP is working with environmental agencies in Tennessee and North Carolina to influence the conditions under which state air quality permits are granted. Comments submitted by the NPS generally describe damage done to date and recommend that any

increases in pollution permitted be offset by reductions in pollutant output elsewhere, and that the best available control technology be used to minimize the amount of new pollution. The Park is also participating in the Southern Appalachian Mountains Initiative, a voluntary, multi-state organization charged with mitigating existing air pollution and preventing future impacts in the southern Appalachians, particularly in Class I areas.

Any significant ATS will almost certainly require the use of clean burning vehicles.

3.4 Recreation Conditions, Issues and Concerns

Recreational opportunities in the Park cover an extremely wide range of activities, including auto touring, hiking, horseback riding, fishing, swimming, picnicking, camping, and viewing of wildlife, historic buildings and vegetation. There are 850 miles of hiking trails in the Park, with 550 open to horseback riding. The Appalachian Trail traverses the entire Park for a distance of 70 miles from southwest to northeast across the ridge tops. Bicycling is somewhat limited since most of the Park roads are narrow and mountainous, and Park hiking trails are closed to mountain biking. Opportunities are limited to the Cades Cove Road, which is closed to motorized vehicles before 10:00 a.m. on Wednesdays and Saturdays during the peak season, and some of the Park's lesser traveled back roads. The Foothills Parkway is one of the more desirable bicycling facilities.

Some of the more popular hiking trails near the Sugarlands entrance, such as Laurel Falls, Baskins Creek and Chimney Tops experience parking constraints that could be relieved by ATS.

■ 4.0 Planning and Coordination

4.1 Unit Plans

The last GMP for the GSMNP was completed in 1982. Park management does not believe that a major update of the entire plan is feasible and plans to address key individual areas of the Park. As noted earlier there is currently a major initiative to address transportation issues in Cades Cove and development issues related to the Townsend gateway area.

4.2 Public and Agency Coordination

The Park works closely with a wide range of State and local agencies in both Tennessee and North Carolina. The upcoming study of regional transportation issues in association with the Knoxville MPO provides an opportunity to expand the geographic scope of regional transportation planning. Among the many agencies and organizations that the Park works closely with are:

- Local governments, municipal and County planning commissions, chambers of commerce, and economic development departments, Cherokee Indian Reservation;
- State DOTs, Economic Development and Environmental Protection in both Tennessee and North Carolina;
- U.S. Department of Energy, Federal Highway Administration, Federal Transit Authority, Tennessee Valley Authority, Oak Ridge National Laboratory, Cherokee National Forest, Nantahala National Forest, Pisgah National Forest;
- McGhee-Tyson Airport, local transit agencies, intercity bus companies and railroads; and
- Civic and environmental organizations.

The Friends of the Great Smokies, created in 1993 and chartered in 1995, is an active support group for the Park that raises money for a variety of projects. Projects include educational programs, historic preservation, national resource preservation and management, facility improvements and equipment. The Park prepares a needs list from which the Friends group selects projects for fund raising. Over \$3 million has been raised by the organization since 1993.

■ 5.0 Assessment of Need and System Options

5.1 Magnitude of Need

Future projections indicate that the ability of internal Park roads and major access roads to handle additional peak season traffic is limited. A University of Tennessee report provided forecasts of Level of Service “F” conditions by year 2006 at the Gatlinburg, Cherokee and Townsend entry points, as well as along U.S. 441 at Sevierville and Pigeon Forge and along U.S. 19 in Bryson City. The need for internal ATS service in Cades Cove is well documented although the development of realistic alternatives will require significant effort.

A 1996 Visitor Survey by the University of Idaho addressed a number of transportation-related issues. Visitors were surveyed during both summer and fall peak seasons. Some of the key findings were:

- Respondents were asked their perceptions of crowding in the Park. During the summer 33 percent of respondents felt the Park was either “very crowded” or “extremely crowded” with people and 55 percent reported similar feelings during the fall. When asked about vehicular crowding, 49 percent of summer visitors responded that the Park was either “very crowded” or “extremely crowded” and 68 percent of fall visitors responded this way.

- About one-fourth (26 percent) of summer visitors reported that traffic congestion delayed their arrival, compared with 37 percent of fall visitors. Both groups identified Gatlinburg and Pigeon Forge as the major points where traffic delays were encountered.
- When asked about alternatives for limiting vehicular congestion, respondents were split between three options that were presented. A first come, first served system was preferred by 35 percent of summer and 36 percent of fall visitors, a shuttle system was preferred by 33 percent of summer and 28 percent of fall visitors and a reservation system was preferred by 22 percent of summer and 24 percent of fall visitors.
- Respondents were asked whether they would be willing to pay a \$5.00 to \$10 entrance fee to help operate and maintain the Park. Among summer visitors 40 percent said yes and 32 percent no, while fall visitors were more willing to pay with 47 percent answering yes and 30 percent no. The remainder was not sure.
- When asked specifically whether they would be willing to park outside of Park boundaries and take a shuttle to Cades Cove, 49 percent of summer visitors and 47 percent of fall visitors responded affirmatively. Negative responses were received from 39 percent of summer visitors and 37 percent of fall visitors.

5.2 Feasible Transit Alternatives

- At a minimum, the Gatlinburg trolley service into the Park should continue the current level of service. Service is oriented primarily toward users of the Elkmont campground traveling to Gatlinburg, as well as Gatlinburg-based visitors traveling to the Laurel Falls trailhead. Additional promotional efforts could help to increase the level of usage between Sugarlands and Laurel Falls. In the future possible reduction in headways to 20 minutes or 15 minutes during peak periods should be considered. The Park would like to use a clean-burning vehicle on the route; this would be a strong candidate for demonstration funds.
- There appears to be a need for transit service in the Cades Cove area. There are a number of potential options for serving this area that could be implemented either individually or in combination. These include:
 - Transit service on the Cades Cove Loop Road with parking provided in a series of small lots near the Loop Road entrance and the Cades Cove campground. While this option would require fewer transit vehicles than those using more remote parking areas, it would be a significant challenge to find adequate parking in the area without impacting resources and views. A series of smaller, less intrusive lots would require significant amounts of labor to manage effectively.
 - Transit service from a remote lot in the Townsend area just outside of the Park. The advantages of this service are that the possibility of finding a large consolidated parking area are much better in this area and that service could also be provided to the Townsend “Wye,” helping to relieve congestion and parking problems in that area as well. Since the trip would be an additional 10 miles each way (in

addition to the 11 miles Loop road itself) additional vehicles would be required, probably with a relatively high level of comfort provided.

- Transit service from Sugarlands and/or Gatlinburg. This service would capture visitors at the Park's busiest entrance and provide an opportunity to use the Visitor Center to promote the service. The trip would be a total of 65 miles, however, (27 miles each way to the loop road in addition to the 11-mile trip) increasing vehicle requirements significantly. This service may be more appropriate as a guided tour.

It is unlikely that a transit system can be effective in Cades Cove unless there is a reduction in the 800,000 automobiles (2.5 million people) that use the Loop Road annually. Strategies for accomplishing this include:

- Closure of the road to private automobiles during peak periods. Besides the major controversy that this would probably engender, it could also overwhelm a new transit system.
- Charge automobiles for access to the Loop Road and use the funds to subsidize a free or inexpensive transit system. The Park's original authorizing legislation, however, forbids charging an entrance fee. It could be argued that the Cove is an attraction within the Park, similar to a campground. Park management, however, believes that even if such a fee were deemed to be legal there is no realistic possibility of its implementation.
- A first-come, first-served system where the road is closed to traffic after a pre-determined number of vehicles enters. Visitors arriving after closure would be offered the opportunity to use the transit service. Good information services would be required at Visitor Centers and in gateway communities so those visitors understood the system. One obvious drawback would be potential traffic congestion and aggressive driving from tourists attempting to reach the area prior to closure. Managing the transit service under this system would be difficult as well, since a surge in demand would occur upon closure with long waiting times resulting.
- A reservation system that required drivers to obtain free permits that would allow entry to the road during a specific hour window. Study would be required to determine the optimal number of vehicles permitted per hour. Permits could be obtained at Visitor Centers in the Park, as well as those outside the Park in Gatlinburg and Townsend. Visitors who did not have a permit would have the option of using the transit system on demand. This option also requires a very extensive and effective information system, using Variable Message Signs and radio advisories outside of the Park to make sure that tourists do not make the trip to the Cove unaware of the need for a permit.

Transit service in the Cove would have a number of special requirements. Current demand can exceed 1,000 persons per hour at peak periods. If these visitors were all shifted to transit, 25 40-passenger vehicles would be required with two- to three-minute headways. This assumes a one-hour travel time around the loop, which may be optimistic. The service may lend itself better to trams, which could expand their capacity during peak periods by adding cars to the back, and possibly carrying over 100 passengers at a time. Engineering analysis would be required to determine how

long a tram the road could accommodate. It will also be necessary to make sure that tourists can carry a reasonable amount of gear comfortably. Maintenance and storage requirements must also be considered, given the sensitive nature of the area. Another issue that must be considered is accessibility under the Americans with Disabilities Act (ADA). Either the transit system must accommodate ADA-eligible individuals, or arrangements may be made to permit them to bypass auto restrictions that may be implemented.

- There is reasonable potential for implementation of transit service on the Roaring Fork Motor Nature Trail. This popular AutoRoute of about six miles starts within the Town of Gatlinburg and is thus adjacent to areas served by the existing transit system. Service could be extended to this road with a relatively small additional number of vehicles. Objectives would be to reduce traffic on this narrow, hilly road and to mitigate the impacts of parking overflow on the resource. The steep narrow grades are of concern to the transit operator, however. It is not clear whether the existing trolleys could effectively handle the road without significant wear and tear.
- A longer-range option involves implementation of transit service on the Newfound Gap Road (U.S. 441) across the Park between Gatlinburg and Cherokee. There is currently a very limited private service between the Harrah's Casino in Cherokee and Gatlinburg. A Park-oriented service would serve major trailheads such as the Chimney Tops, the Newfound Gap Lookout and possibly the Clingman's Dome road as well. Given the distance and time required for this trip, it may be more desirable to initiate it as a tour service in order to test the demand. Another option is to initially service only the Tennessee side between Sugarlands (and Gatlinburg) and Newfound Gap, where demand is likely to be highest.



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■ 7.0 Persons Interviewed

Karen P. Wade, Superintendent, Great Smoky Mountains National Park

Shawn Bengé, Principal Planner, Great Smoky Mountains National Park

Christopher Stein, Chief of Interpretation, Great Smoky Mountains National Park

Bob Miller,, Great Smoky Mountains National Park

Cindy Cameron Ogle, City Manager, Gatlinburg, Tennessee

Buddy Parton, Transit System Manager, Gatlinburg, Tennessee

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